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ARINC Wireless Interoperable Network Solutions (AWINS™)

An Architecture for
IP - Based Communications Interoperability

Agenda

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- ARINC Overview
- Radio Interoperability
- AWINS Solution Overview
- Meeting PSRSPA Requirements
- Case Study: Hurricane Katrina, and Operation Lifeline
- Summary
- Questions

An Integrator and more...

- A Culture of providing **Mission Critical Services**
- Recognized performance during crisis
- Certified Radio Maintenance Repair for most Radio systems
- Full Service: Helpdesk, NOC, On Call Maintenance
- Quality Performance reviewed quarterly by the Board
- ISO Certified

ARINC, an Integrator who lives what we deliver!

- 75 years of proven experience in design, deployment and support of radio systems, worldwide
- World's largest private RF data link network with IP interoperability
 - Supports all major airlines, package carriers, and their suppliers
- Manage over 16,000 Motorola, IDEN, and M/A COM 2-way land mobile radios
 - Includes all radios in use by TSA airport security
- Leader in providing systems integration and engineering services with a record of delivering projects on time and under budget

A Brief History of ARINC's Radio Experience

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- Chartered in 1929 to manage aeronautical radio frequencies
- Provided VHF and HF communications throughout the 48 contiguous states and throughout the world
- Provide oceanic communications for the airlines, outsourced from the FAA since 1977
- VHF Datalink (VDL) supports critical radio messaging communications between all major airlines and the FAA
- Manage all TSA LMR radios in 442 airports
 - System installed in approximately 90 days
 - Supports 9500 radios and repeaters
- Began applying radio and network expertise to public safety in early 2000
- Introduced interoperable communications for first responders in 2002

SAFECOM Interoperability Defined

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- **“Wireless interoperability** is the ability of public safety service and support providers to talk with each other via voice and data
 - on demand
 - in real time
 - when needed
 - when authorized”

Source: SAFECOM, Improving Public Safety Wireless Communications and Interoperability (June 2004)



The Interoperability Challenge

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- Incompatible and aging communications equipment
- Limited and fragmented budget cycles and funding
- Limited and fragmented planning and coordination
- Limited and fragmented radio spectrum
- Limited equipment standards

Source: National Task Force on Interoperability (February 2003)

ARINC Wireless Interoperable Network Solutions (AWINS™)

AWINS is a standards based architecture that enables interoperability among disparate communication devices

- Commercial-Off-The-Shelf (COTS) products
- Convergence of voice, video, and data
- Open standards based architecture

AWINS delivers a comprehensive interoperable communications solution for day-to-day and crisis operations that is significantly more cost effective than radio replacement.



AWINS Concept

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- Integrate existing RF Systems and an IP Network using Cisco LMR Gateways
- Utilize centralized Command and Control software to provide audio management and conferencing capabilities
- Interconnect with other interoperability solutions already in place
- Bridge communications between legacy and future radio systems including P25 compatible systems
- Move beyond “Radio Interoperability” to true “Communications Interoperability”
- Deploy regionally and scale incrementally
- Deliver using a repeatable, tested, and trusted methodology

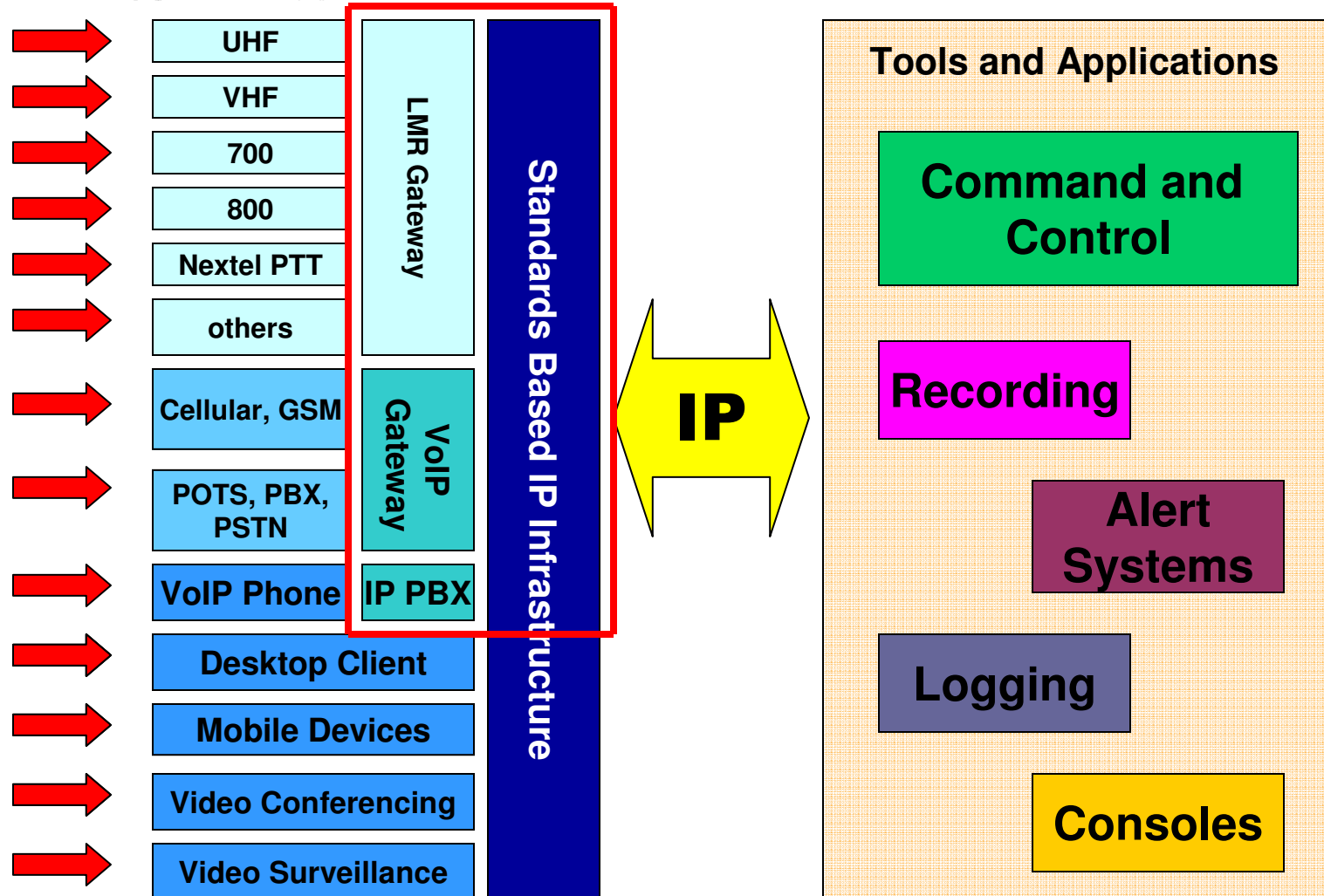
- The basis of AWINS is a **common language** for interoperability and a **command and control plane** that manages access to information and directs communications to appropriate parties
- Internet Protocol (IP) is the primary building block
 - Worldwide standard that enables efficient transfer of voice, video and data on a common platform
 - Many commercial products available
 - Extremely scalable, very resilient
 - Offers independence from layer 1 and 2 technologies
 - Enables Quality of Service (QOS) management techniques
 - IP Multicast provides high degree of efficiency
- Command and control is implemented at the application layer
 - COTS products with standards based interfaces

- Voice over IP (VoIP) is the audio “language” within AWINS
 - ITU G.711 and G.729 codecs convert between analog audio and digitized audio
 - Multicast and Real Time Protocol (RTP) carry VoIP traffic
 - H.323, SCCP, and SIP are used for signaling (call setup/tear down)
- For non-native IP or VoIP technologies a “gateway” is used to translate to and from VoIP
 - LMR Gateway for Radio:
 - An E&M port is used to obtain the analog audio from a radio (base station, mobile, or handheld)
 - 2 wire, 4 wire, or BIM Card interface
 - VoIP Gateway for POTS/PSTN/PBX:
 - Conversion to VoIP by Cisco Unified CallManager

AWINS Logical Model

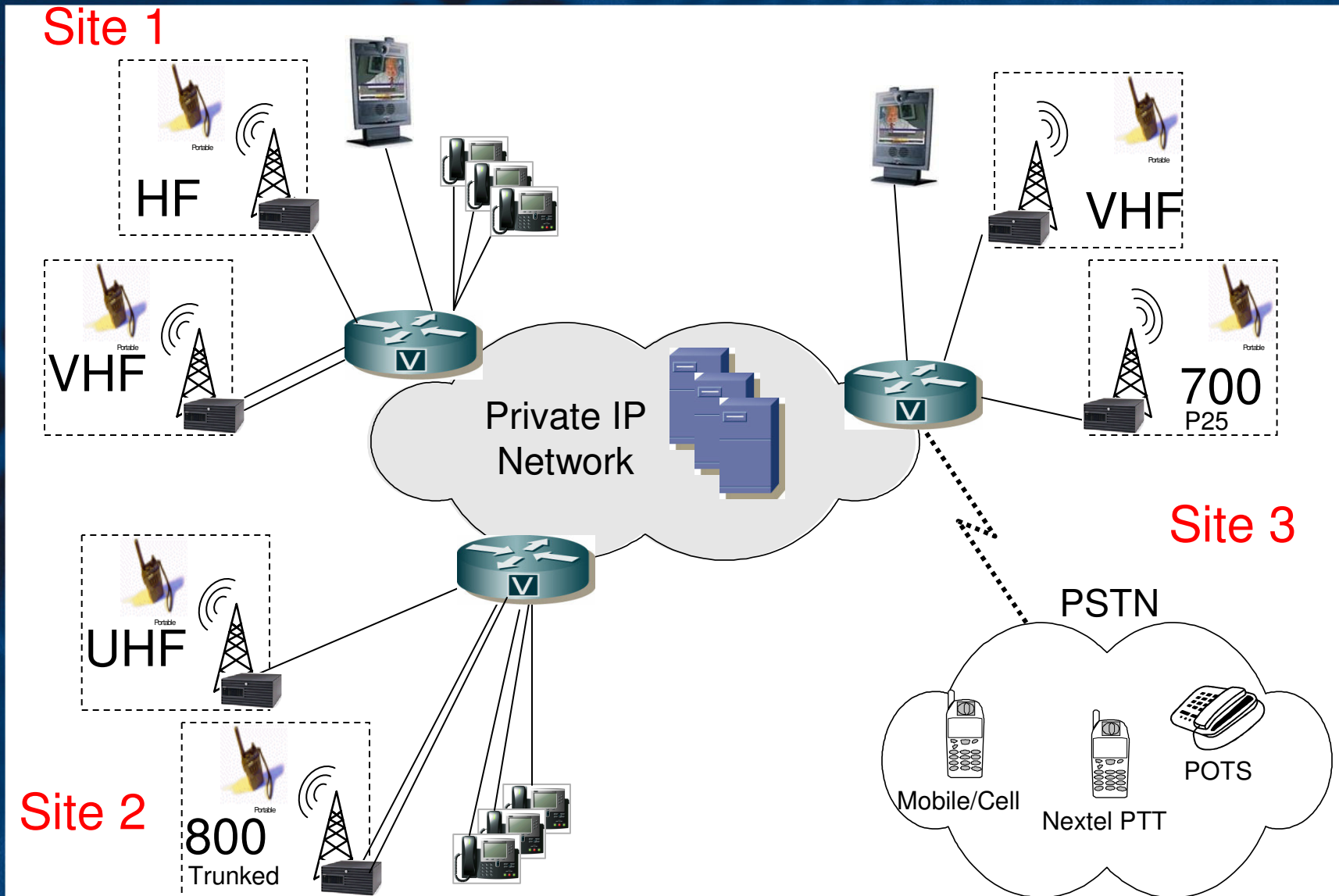
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Interoperability Single Box



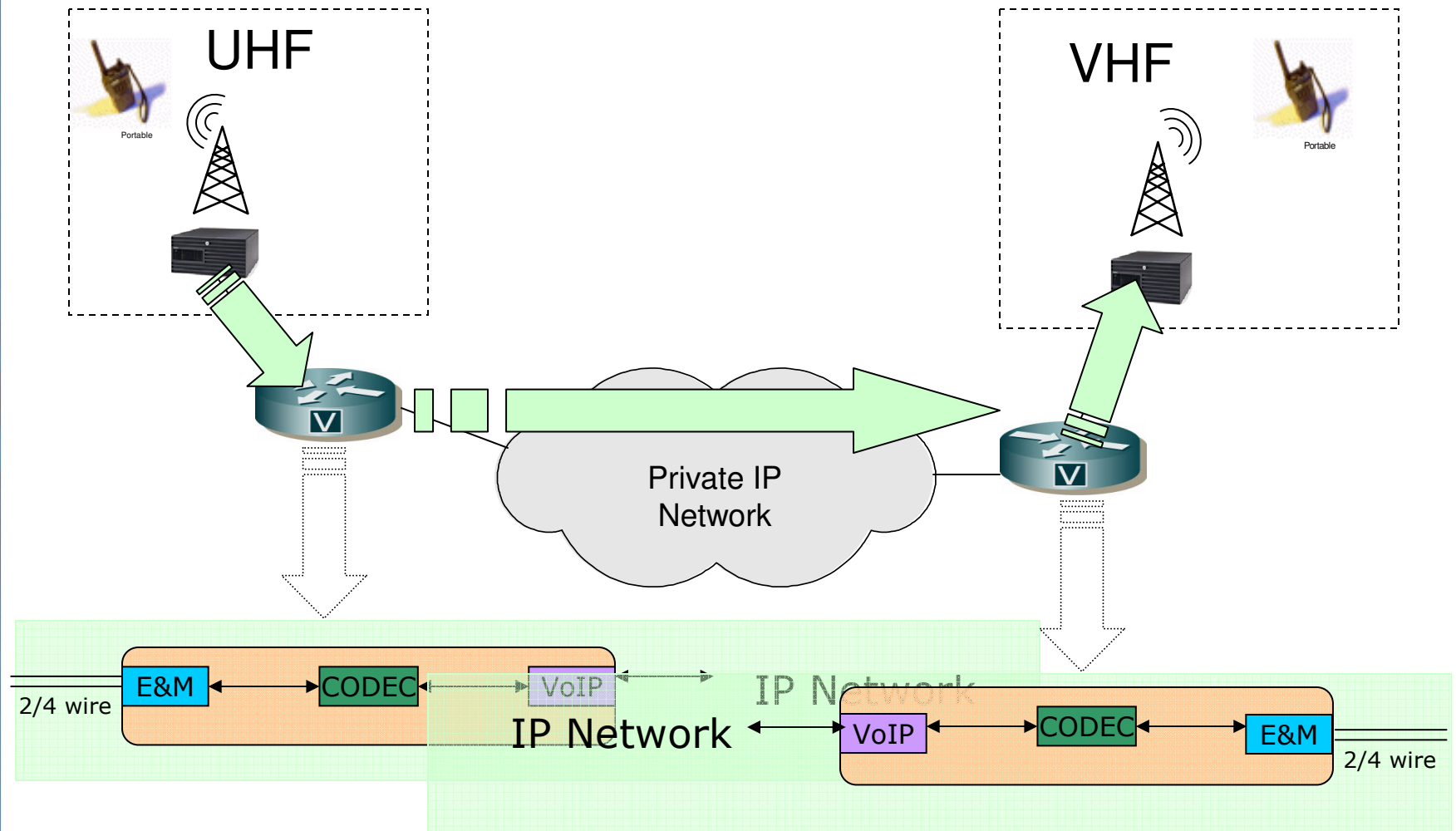
AWINS Architecture

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Path of a Radio Transmission

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Meeting PSRSPC Requirements

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- AWINS meets PSRSPC requirements in the areas of communications interoperability
 - AWINS leverages existing radio implementations while enabling their interoperability
 - Hierarchical user roles allow for discrete control of who can talk to who, and under what circumstances
 - Interoperability is integrated with governance and standard operating procedures defined by the customer
 - Local control of local resources is integrated into a larger scale deployments
 - AWINS can incorporate new radio systems as antiquated systems are replaced
- The AWINS architecture allows for secure, reliable, resilient, scalable solutions
 - The IP foundation of AWINS allows the customer to determine the right fit for it's implementation
 - Modular components prevent forklift upgrades
 - Encrypted communications are implemented within the network

Meeting PSRSPC Requirements

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- AWINS uses a centrally managed network of gateways that provides several benefits
 - Implement locally, grow to regional and statewide implementations
 - Quick implementation, typically months to have initial interoperability requirements met
 - Components become part of larger implementation over time
 - Hierarchical roles for local, regional, and statewide integration
 - Enables a tactical response to crisis events, and the ability to add specialists regardless of distance
 - Cost effective, often 1/10 the cost of a large-scale radio replacement
 - More scalable than standalone gateways
 - Leverages existing standalone gateways
 - Central management view prevent loops and other problems of independent gateways

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Separate Systems
Local Interoperability
Regional Interoperability
Statewide Interoperability

November, 2005

Meeting PSRSPC Requirements

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- IP enables an integrated system
 - Applications utilize and direct resources on a common network
 - Additional applications and capabilities can be added seamlessly over time as technology or requirements advance
 - Applications can work independently or in concert with each other in the same network
 - IP quality of service mechanisms ensure each application gets it's proper priority
 - Priority is determined by the customer, and can be changed over time
 - The same network carries voice, video and data

Meeting PSRSPC Requirements

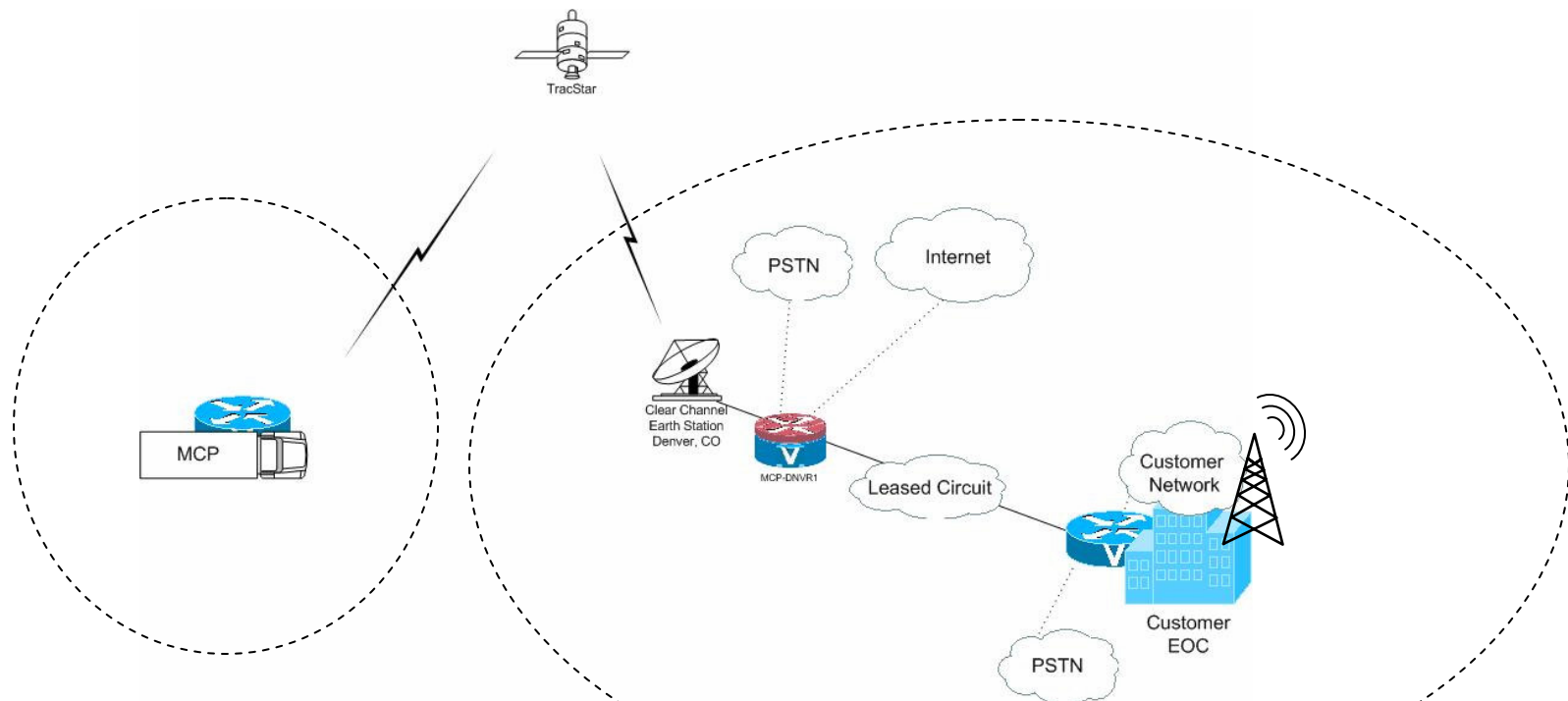
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- AWINS goes beyond radio interoperability to communications interoperability
 - Phones, mobile phones, computers, PA systems and more become part of an integrated system
 - Any number and type of devices can be included in a talk group
 - More intelligent devices have direct access to talk groups, or specific communications paths, other devices utilize a dispatcher
 - Video surveillance can be viewed on any computer on the network
 - A radio can be incorporated into the audio portion of a video conference

Meeting PSRSPC Requirements

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- Mobile Command Vehicles (MCVs) fill communications gaps
 - RF coverage can be expanded with MCVs into areas where fixed coverage does not reach, or where coverage is degraded due to failure
 - IP becomes the “reach back” to the main RF footprint



- **Case Study: Hurricane Katrina, and Operation Lifeline**
 - **Anne Arundel County and ARINC respond in Jefferson Parish, Louisiana**

- In the post-event analysis of Hurricane Isabel, Anne Arundel County Maryland recognized the need for “Mobile Command Vehicle” that would enable emergency services staff to respond more effectively to large scale disasters and events
- The county worked with ARINC and MBF Industries to develop “Mobile Command and Control Unit 1” (MCCU-1) which was delivered in the fall of 2005
 - MBF built the truck
 - ARINC provided the communications infrastructure and acted as the Project Manager

County Objectives

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- Anne Arundel County wanted a Mobile EOC that would allow them to:
 - Remain operational in the event the primary EOC is unavailable.
 - Manage emergency operations using the National Incident Management System (NIMS) from a mobile environment.
 - Stream video surveillance footage and have video teleconferencing capabilities from the Mobile Command Vehicle back to the Anne Arundel County EOC
 - Establish Interoperable Communications with any agency in the State of Maryland and jurisdictions in counties of border states.

MCCU Communications Capabilities

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- Communications vehicle designed to allow for mobile communications and RF interoperability. Systems include:
 - 800 MHz
 - UHF
 - VHF High Band
 - VHF Low Band
 - Marine Band
 - Aviation Band
 - RACES VHF Voice/Packet (HAM/Amateur)
 - RACES HF Band (HAM/Amateur)
- Will allow for mobile communications and interoperability between
 - 17 RF Systems (479 Frequencies-250 programmed)
 - 20 IP Phones
 - 10 POTS/Cell connections
 - Interconnected with County phone systems
- Other capabilities include Video Teleconferencing, Video Surveillance, and Data Applications.



Anne Arundel Mobile Command Vehicle

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Position Layouts

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- MCCU-1 was requested by 3 different response efforts.
- Deployed on September 2nd, 2005 to provide communications and logistics support to *Operation Lifeline* in Jefferson Parish, LA.
- Operation Lifeline was a response effort put together by the State of Maryland to establish 6 medical clinics in Jefferson Parish to treat citizens and transport them to functioning hospitals.
- The MCCU was operational within 45 minutes of arriving at the mission base camp, Meadowcrest Hospital
- The MCCU provided dispatch and interoperable communications for over 20 different agencies with disparate radio systems.

- At a ceremony honoring the Anne Arundel Team that participated in Operation lifeline, Chief Ron Blackwell of the Anne Arundel Fire Department summed up MCCU-1's performance this way:

“There are always some questions in your mind, will it do what we've been told when it's most needed... this unit passed that test with flying colors”

- The county also cancelled acceptance testing, confident that MCCU-1 was up to the task
- More importantly, Operation Lifeline treated over 6000 patients in 2 weeks

Additional Interoperability Projects

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- Clallam County, Washington (OPSCAN)
 - DHS Grant for interoperability
 - 23 sites, 42 agencies across 200 radio channels
- Anne Arundel County Mobile Command Vehicle
- Anne Arundel County Emergency Operations Center
- FEMA Mobile Command Vehicles
- First Air Force - Collaboration Decision Aid
- Orange County Mobile Command Vehicle
- Washington State Region 8 Interoperability
- Pilot Projects:
 - Massachusetts Southeast Region (5)
 - Miami (Airport, TSA, Miami-Dade Police)
 - National Guard Bureau - CWID

A solution architecture that:

- Protects legacy investments
- Scalable and expandable
- Leverages existing backbone infrastructure
- Cost effective
- Standards based
- Provides near term availability

- ARINC has the technical expertise and experience to help California achieve their interoperability objectives
- Our solution provides you with:
 - The ability to leverage existing infrastructure and interoperate with other Local, State and Federal agencies
 - A highly reliable and affordable IP based architecture solution
 - An easy-to-use, interoperable, showcase project

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Learn more at

www.AWINS.net

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